Auditory Competency Categories in Everyday Situations and Settings© (ACCESS)

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The Auditory Competency Categories in Everyday Situations and Settings© (ACCESS) is designed to help the aural rehabilitation practitioner to a) identify auditory competencies of the listener and to b) set short-term objectives and long-term goals in Audition.

The primary goal of an auditory based aural rehabilitation program, such as Auditory-Verbal Therapy or Auditory Skills Training, is to create successful and meaningful listening opportunities for the listener (user of hearing technology) so that new auditory competencies develop in a sequential manner. The aural rehabilitation practitioner accomplishes this goal by:

1) assessing the listener's current and highest category of auditory competency;
2) determining which strategies and conditions were used to help the listener achieve his/her highest category of auditory competency;
3) selecting appropriate goals in audition and strategies and conditions for listening success; and
4) adapting strategies and conditions to scaffold auditory learning (make more challenging).

As recently developed auditory competencies are demonstrated by the listener, listening tasks should become more challenging so that new auditory competencies can be developed. The aural rehabilitation practitioner must find the listener's "zone of proximal development" (not too hard; not too easy; just right). In other words, a targeted auditory competency should be one that can be learned with the assistance of a listening partner in a short period of time. The aural rehabilitation practitioner is to create natural listening conditions where very few, if any, strategies are used to ensure speech perception, consistent auditory attention, and effective auditory processing. The fewer strategies and conditions are utilized or adapted, the better. Listening in real life with real voices in real time is the goal.

The ACCESS includes not only the categories of auditory competencies, but a comprehensive description of the strategies and conditions that were used when the listener demonstrated the auditory competency.

Strategies That Facilitate/Challenge Listening: There are 34 evidence-informed/based strategies that facilitate one or more of the four goals of the aural rehabilitation practitioner: 1) create a listening environment, 2) strategies that facilitate listening in auditory-only condition, 3) enhance speech perception, 4) facilitate auditory processing.

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Create a Listening Environment

- introduce acoustic treatment to the listening environment by adding furniture, carpeting/rugs, removable ceiling tiles/acoustic tiles, lowering the ceiling, turning off noise-making appliances
- close the door and window
- control presence, volume or type of noise source
- adjust the positioning (geography) of listener in relation to wall, noise source, and sound treatment (furniture)

Strategies that Encourage Listening in Auditory-Only Conditions

- prompt the listener to "Listen!"
- use Visual Distraction Techniques (VDTs)
- auditory first and last (auditory sandwich)

Strategies that Enhance Auditory Perception (aka acoustically highlighted speech)

- sit beside the listener on the side of the CI or in front (& hearing technology)
- whisper the word
- say word using soft conversational loudness level (avoid loud)
- elongate a sound in a word (or an unstressed word in a phrase)
- put emphasis or stress on a sound in a word or a word in a phrase
- pause before and after the sound, word, or phrase
- sing a word or portion of the phrase
- auditory contrasts (compare heard word/phrase with spoken word/phrase)
- say the phrase naturally or slightly slower
- move closer/move further away from the microphone of hearing technology

Strategies that Facilitate Auditory Processing

- present a listening look with a verbal prompt (gains auditory attention)
- use a familiar speaker/accent/gender
- use auditory hooks (gains auditory attention)
- wait (give time for the listener to process what was heard)
- ask, "What did you hear?" (internal auditory rehearsal and external auditory rehearsal)
- adjust rate of speech (slow down or speed up)
- chunk/segment longer phrases into smaller parts by pausing between parts
- reword (using a different word to rephrasing entire message) or provide alternative messages that mean the same thing
- use auditory cloze (auditory closure) or provide auditory cloze listening tasks
- spell out the missing word
- go through alphabet/numbers and stop at the target letter/number
- contrast what was heard with what was said
- provide a definition of the missing word or phrase
- auditory sandwich (e.g. use natural first, then strategies if necessary, then natural last)
- give choices of what sound/word/phrase could be (with correct presented last)

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- realize all errors lead to new learning and/or improved auditory access (accept mistakes)
- positive listening self-talk (e.g. I heard the doorbell! I'm so glad I was right!)

Conditions that Facilitate/Challenge Listening: There are 25 conditions that can be adapted to scaffold learning and promote successful listening opportunities for the user of hearing technology. These conditions should change continuously to a) assess currently level of auditory competency and b) create listening tasks (with that will develop new listening skills that accomplish with the help of a therapist and family member within several sessions. The conditions of the listening tasks are implemented and/or adjusted considering the 1) listener's auditory access to sounds across the speech spectrum; 2) the listener's zone of proximal development; and 3) the listener's needs and goals.

Geography

- position of the speaker in relation to the listener's better ear/new hearing technology
- distance between listener and speaker (6 inches vs. 3 ft vs. 6 ft vs. 10 ft., etc.)
- position of the speaker to the listener in general (front, beside, behind, below, above, etc.)
- primary sound source location (inside vs. outside the room; outside building (street vs. sky)
- position listener away from the source of noise; preferably facing a corner/wall.

Sound Stimulus

- type of sound stimulus (environmental vs. speech vs. music)
- presentation of sound stimulus (live vs. recorded vs. phone)
- familiarity of the sound stimulus (known vs. unknown) (e.g. familiar song vs. new song;);
- size of the set (small (2-6), medium (6-12), large (12+);
- type of set (closed, bridge, open) of sounds/messages presented;
- contrast of sound stimuli presented (frequency vs. loudness vs. rate)

Speech Stimulus

- familiarity of speaker's voice (familiar →unfamiliar)
- familiarity of the speech stimulus (e.g. familiar words, phrases, topic of conversations/stories to new/unfamiliar words, phrases, topics of conversation/stories)
- contrast of speech stimuli; multi-syllabic words (frequency vs. loudness vs. rate) (elephant vs. cat) → monosyllabic words (same initial consonant & vowel content but final consonant differ by place cues (bat vs back)
- loudness of sounds/speech (loud vs. conversational vs. whispered)
- rate/speech of speech (slow paced vs. rapid paced)
- length of message (phrases vs. mono-syllabic word; conversation vs. story vs. news report)
- number of speakers speaking within conversation (single vs. multiple speakers)
- number of speakers speaking at the same time (dichotic listening tasks)
- messages staggered or on top of one another (dichotic listening tasks)

Listening Environment (Figure Ground)

- characteristic of listening environment (quiet vs. noisy or house vs. work vs. car);

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- consistency of background noise (intermittent vs. continuous)
- type of background noise (environmental vs. speech vs. musical)
- direction of the background noise (behind listener vs. in front of listener vs. to side of listener)
- distance between speech signal and background noise source (same vs. different locations)

Diagnostic Information

1. Percentage of accuracy is measured upon the listener's success upon hearing correctly upon **first presentation**. For example, if ten messages are presented and the listener correctly heard five of the ten messages correctly upon **first** presentation, then he demonstrated 50% accuracy.
2. The listener can demonstrate some skills in multiple levels. The purpose of the ACCESS is to help the practitioner provide a comprehensive description of the listener's auditory competencies in everyday situations and settings.

Auditory Competency Categories in Everyday Situations and Settings Checklist© (ACCESS Checklist©)

The listener demonstrates:

Level 0 No Awareness of Sound/Hearing Technology Activated and/or Programmed

☐ No awareness of environmental and/or speech sounds.

Level 1 Directed Attention to Environmental Sounds and Acoustically Highlighted Speech
(Familiar Speaker - Small to Medium Sized Closed Set – Quiet Listening Environment)

The listener demonstrates:

☐ awareness of environmental and/or speech sounds with direction*; but unable to discriminate/identify.

☐ identification of female, child and male voices.

☐ discrimination between words of varying syllable lengths in closed set (e.g. chair vs. alligator).

☐ discrimination between phrases of varying lengths in closed set (e.g. Hey! vs. Thank you! vs. I love you vs. When's your Birthday? vs. Do you want some ice-cream for dessert?).

☐ identification of word last heard during live voice auditory tracking tasks using slower than usual rate of speech.

☐ detection/discrimination of all sounds of the Ling's Six-Sound Test but has difficulty identifying them.

☐ detection of environmental sounds (e.g. phone/mobile ringing) with direction/assistance (e.g. attention directed to sound).

☐ detection of speech within listening environments with low level background noise (e.g. the car) 50% of the time, but does not discriminate, identify or comprehend.

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☐ detection of multiple speakers vs. single speakers <=50% of time but cannot localize.

☐ discriminates/identifies between different types of music (e.g. country vs. jazz vs. orchestra vs. pop music vs. rap, etc.)

Level 2 Non-Directed Attention to Environmental Sounds and Heavy Acoustically Highlighted Speech
(Familiar Speaker- Large Closed Set to Bridge Set – Quiet Listening Environment)

The listener demonstrates:

☐ awareness of some environmental and/or speech sounds without direction; able to discriminate/identify with 50% accuracy.

☐ discrimination/identification between words that are similar in length but varies in vowel and consonant content in (by manner/place/voicing) in closed set (e.g. shoe vs. cat vs. dog).

☐ discrimination/identification of commonly heard recitations/patterns such as counting by 1's, 2's, 10's, alphabet, days of the week, months of the year, etc. with ≤50% accuracy.

☐ discrimination/identification of commonly heard questions such as "When's your Birthday?" "What's your last name?" in bridge set.

☐ identification of most sounds of Ling's Six-Sound Test.

☐ detection of environmental sounds (e.g. phone/mobile ringing) 50% of the time.

☐ detection of speech in low level noise (e.g car) 100% of time; discriminates/identifies/comprehends some words and phrases <=30% of time.

☐ detects whether there is a single speaker vs. multiple speakers 100% of time; and can localize speakers from side to side 50% of the time when speakers are speaking one at a time.

☐ Identifies song(s) from a small set of familiar songs.

Level 3 Slow-Paced Speech Listening in Quiet to Single Speaker with additional Acoustic Highlighting
(Familiar Speaker- Bridge Set Only)

The listener demonstrates:

☐ awareness of ALL environmental sounds inside the room without direction; able to identify with 80% accuracy.

☐ discrimination/identification of words that are similar in length, vowel and but differences in manner of production (cake vs. bake) in closed set.

☐ discrimination/identification of commonly heard recitations/patterns such as counting by 1's, 2's, 10's, alphabet, days of the week, months of the year, etc. with >80% accuracy in bridge set only.

☐ discrimination/identification of multi-syllabic words in open set (e.g. elephant, cowboy, hippopotamus).

☐ discrimination/identification of items within a known category (bridge to open set) (e.g. vegetables- carrots, tomato, cauliflower).

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☐ discrimination/identification of questions/comments within a conversation with questions pertaining to topic/context (e.g. What's for dinner tonight? What kind of pasta? I don't like pasta; I prefer steak, etc.)

☐ identification all sounds of Ling's Six-Sound Test 100% of the time.

☐ detection of environmental sounds (e.g. phone/mobile ringing) >=80% of the time.

☐ discriminates/identifies speech in low noise settings (e.g. car) <=50% of time.

☐ detection of speech in low level noise (e.g car) 100% of time; discriminates/identifies/comprehends some words and phrases <=50% of time.

☐ identification of number of speakers (up to 3)100% of time; localization of speakers side to side 100% of the time and behind/in front 50% of the time; identifies some words and phrases <=30% of the time when speakers are speaking one at a time.

☐ Identifies song(s) from a medium size set of familiar songs.

Level 4 Medium-Paced Speech Listening in Quiet to Single Speaker with additional Acoustic Highlighting
(Familiar Speaker- Open Set/Telephone; Un-Familiar Speaker-Closed Set to Bridge Set)

The listener demonstrates:

☐ awareness of ALL environmental sounds outside the room without attention drawn to them; able to identify with 50% accuracy.

☐ discrimination/identification of commonly heard recitations/patterns such as counting by 1's, 2's, 10's, alphabet, days of the week, months of the year, etc. with 100% accuracy in open set.

☐ discrimination of single syllable words in open set with some manner (bit vs. sit) and/or place cue errors as being acceptable (e.g. poke vs. coke); vowel content is correct.

☐ identification of most questions/comments within conversation (open set) with repetitions and/or acoustic highlighting.

☐ identifies all sounds of Ling Six-Sound Test at a distance of 2 m with 100% accuracy.

☐ identifies and recalls 3 details from a short story consisting of 100-200 words presented by familiar speaker.

☐ discrimination/identification of commonly heard questions in closed set on the telephone with familiar speaker 80% accuracy.

☐ discrimination/identification of recorded commonly heard questions/phrases in closed set on computer based self-auditory training programs.

☐ identification of location of environmental sounds (e.g. phone/mobile ringing) (at a distance) 50% of the time.

☐ identification/comprehension some words and phrases in low level noise (car) 80-100 % of time when speaker is on the side of the new hearing technology; 50% of the time when speaker is on the opposite side of the new hearing technology.

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☐ identifies number of speakers (up to 5) 100% of time; localize speakers behind/in front 100% and down low and to the side (left and right) 50% of the time; and can comprehend speech >=50% of the time when speakers are speaking one at a time.

☐ Identification of song(s) from a large set of familiar songs.

Level 5 Regular-Paced Speech. Listening in Low-level Noise. Introduction to 2 Speakers
(Unfamiliar Speaker- Open Set/Telephone- 2 Familiar Speakers at a time-Bridge Set)

The listener demonstrates:

☐ awareness of all environmental sounds outside the building without direction; able to identify with 80% accuracy.

☐ discrimination/identification of single syllable words in open set with place cue errors only as being acceptable (e.g. tick vs. kick).

☐ identification of all questions/comments within a regularly paced conversation with few repetitions and very little acoustic highlighting with unfamiliar speaker.

☐ identifies all sounds of Ling Six-Sound Test at a distance of 6 m.

☐ identifies and recalls all details from a short story consisting of 200 words or more presented by a familiar speaker; less with unfamiliar speaker.

☐ discrimination/identification of commonly heard questions/phrases in open set on the telephone with 80% accuracy.

☐ discrimination/identification of commonly heard questions/phrases in small closed set within figure ground (noise) and binaural integration listening tasks (competing speech).

☐ discrimination of recorded of recorded commonly heard questions/phrases in bridge to open set (context is known) on computer based self-auditory training programs.

☐ comprehension of one-on-one/two conversations comments in high level noise (e.g. a busy restaurant) with >=80% accuracy.

☐ comprehension of conversation in low level noise (e.g. kitchen, car) if speaker is on the opposite side of listener's better hearing technology and when listener is not multitasking (e.g. sous chef, passenger in the car) with 90-100% accuracy; and 50% of the time when speaker is on the same side of the new hearing technology and the listener is multi-tasking (e.g. chef, driver in car).

☐ localization of speakers above and to the side 100% of the time, and can comprehend speech >=100 % of the time when speakers are speaking one at a time.

☐ can perform auditory tracking with lyrics in songs (e.g. when lyrics are provided as closed set, the listener can comprehend lyrics as sung in a song.

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Level 6 Fast-Paced Speech in Noise. Listening to 2-3 Speakers in Quiet. Listening to Degraded Speech in Quiet
(Unfamiliar Speaker- Open Set/Telephone- Familiar Speaker-Open Set)

The listener demonstrates:

☐ awareness of all environmental sounds outside a moving vehicle without attention drawn to them; able to identify with >50% accuracy.

☐ localization of non-speech noise that occur once or twice (elevator alerts, alarm system, cell phone alerts, light items that fall to floor, birds chirping in trees, etc.) with >=50% accuracy.

☐ identification of single syllable words with multiple rhyming counterparts (sin, tin, thin, fin, shin, kin, pin, etc.) in open set and quiet to low-level noise with >80% accuracy.

☐ identification/comprehension of oddly worded sentences in open set in quiet with 100% accuracy and within low-level noise with >70% accuracy.

☐ identification/comprehension of fast paced speech that's on the radio or television (e.g. comedians, news, etc.) in quiet with <=60% accuracy.

☐ identification/comprehension of all questions/comments in a one-one-one/two fast-paced conversation with frequent and/or unexpected topic changes in quiet with >80% accuracy and in noise <50% accuracy.

☐ comprehension and recollection of all details from a longer story (500 words or more presented by an unfamiliar speaker but no accent in quiet and/or low-level noise.

☐ comprehension of of questions/comments in a phone conversation using fast paced speech and frequent topic changes in quiet.

☐ comprehension of recordings of commonly heard questions/phrases/words in open set (e.g. computer based self-auditory training programs that clear in quality with >=80% accuracy.

☐ comprehension of recorded conversations, longer stories and lectures (audiobooks, TEDTalks) with unaccented speech and some intermittent music in the background with >=80% accuracy

☐ comprehension of live and heavily degraded speech (accents, mumbled speech, missing words, etc.) during conversations with multiple speakers with >=80% accuracy in quiet.

☐ comprehension of one-on-three conversations using regular-paced rate of (unaccented) speech in moderate to high-level noisy listening environments (e.g. restaurants).

☐ comprehension of conversation in low level noise when speaker is behind listener with new hearing technology and the listener is multi-tasking (e.g. back seat passenger who is reading a map and participating in conversations) with 100% accuracy.

☐ comprehension of conversation in high-level noise (e.g. busy indoor playground, a restaurant that's not too busy) if speaker is on the opposite side of listener's better hearing technology and when listener is multitasking (e.g. listener is picking a child up or is cutting food) 50-80% accuracy.

☐ Discrimination/identification of commonly heard questions/phrases in large (15-20) closed set within binaural integration listening tasks (competing speech) (e.g. listening to one person on the phone while responding to a question asked by another person in the same room).

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☐ Discrimination/identification of commonly heard questions/phrases in large (15-20) closed set within binaural separation listening tasks (competing speech) (e.g. listening to one person only when a question asked by another person at the same time).

☐ can identify/comprehend >=80% of lyrics as sung in a familiar song (lyrics somewhat memorized) and 30% of lyrics as sung in an unfamiliar song (usually the chorus of the song).

Level 7 Multi-Tasking/Multi-talker/Degraded Speech in Complex Noise/Multiple Speakers Listening
(Telephone Unfamiliar and Accented Speaker- Open Set; Recorded/Radio Unaccented and/or Familiar Speaker- Open Set)

The listener demonstrates:

☐ awareness of all environmental sounds outside a moving vehicle without attention drawn to them; able to identify with >80% accuracy.

☐ localization of non-speech noise that occur once or twice (elevator alerts, alarm system, cell phone alerts, light items that fall to floor, birds chirping in trees, etc.) with >=80% accuracy.

☐ identification of single syllable words with multiple rhyming counterparts (sin, tin, thin, fin, shin, kin, pin, etc.) in open set with >80% accuracy in moderate level noise.

☐ identification/comprehension of oddly worded sentences in open set in moderate-high level noise >80% accuracy (or noise comes from same source as speech).

☐ identification/comprehension of fast paced speech that's on the radio or television (e.g. comedians, news, etc.) in low level noise with <=80% accuracy.

☐ identification/comprehension of all questions/comments in a one-on-two/four speaker fast-paced conversation with frequent and/or unexpected topic changes in quiet with >80% accuracy and in noise <50% accuracy.

☐ comprehension and recollection of all details from a longer story (500 words or more presented by an unfamiliar speaker but no accent in quiet and/or low-level noise while multi-tasking.

☐ comprehension of questions/comments in a phone conversation using fast paced speech and frequent topic changes in low to moderate level noise and multi-tasking.

☐ comprehension of open set but commonly heard questions/phrases/words that are recorded (e.g. computer based self-auditory training programs that clear in quality in high level noise with >=80% accuracy.

☐ comprehension of recorded conversations, longer stories and lectures (audiobooks, TEDTalks) with accented speech and some intermittent music in the background with >=80% accuracy

☐ comprehension of live and heavily degraded speech (accents, mumbled speech, missing words, etc.) during conversations with multiple speakers with >=80% accuracy in moderate to high level noise.

☐ comprehension of one-on-three conversations using fast-paced rate of (unaccented) speech in moderate to high-level noisy listening environments (e.g. restaurants).

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☐ comprehension of conversation in moderate level noise when speaker is behind listener with new hearing technology and the listener is multi-tasking (e.g. speaker is slightly behind listener at a party or group gathering) with >=70% accuracy.

☐ comprehension of conversation in high-level noise (e.g. busy indoor playground, a restaurant that's not too busy) if speaker is on the opposite side of listener's better hearing technology and when listener is multitasking (e.g. listener is picking a child up or is cutting food) with 80% accuracy.

☐ discrimination/identification of commonly heard questions/phrases in bridge to open set within binaural integration listening tasks (competing speech) (e.g. listening to one person on the phone while responding to a question asked by another person in the same room).

☐ discrimination/identification of commonly heard questions/phrases in bridge to open set within binaural separation listening tasks (competing speech) (e.g. listening to one person only when a question asked by another person at the same time).

☐ identification/comprehension of >=60% of lyrics as sung in an unfamiliar song that is slow-paced; and <= of lyrics as sung in an unfamiliar song that fast-paced.

Glossary of Terms

Direction/Assistance: The listener requires direction or assistance from another person to gain awareness of sound, identification of sounds, or comprehension of a spoken message.

Closed Set: All options/choices are available for client's view and client chooses the option that best matches what was heard. For example, taking an order from a restaurant menu would be an example of a closed set listening task. The closed set can be as small as a set of 2 choices and as large as 25 depending on level of listening difficulty. Making a listening task "closed set" helps reduce level of listening difficulty and effort and promotes listening success in the earliest stages of auditory skills development.

Bridge Set: The topic/category name/context of choices are presented to the client before the listening task begins. For example, the topic of conversation may be disclosed before conversation starts or the category name of word choices will be disclosed prior to presentation of words; narrowing down possibilities of choices. The listener relies on their cognitive skills to retrieve possible choices and their listening skills to choose the best answer.

Open Set: The possibilities of choices/stimuli are endless and the client relies wholly on listening skills to choose the best answer or respond appropriately. The topic/context/categories are unknown to the listener. This is the highest level of listening difficulty. Making a listening task "open set" helps to raise the level of listening difficulty and listening effort and the goal is to achieve open set listening skills for conversations in all types of listening environments.

Examples of Auditory Training Resources and Their Listening Task Classification

Aural Rehabilitation Manuals (Closed Set)

Audiobooks (Auditory Tracking) (Closed Set)

Conversations (Closed Set->Bridge Set->Open Set)

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Reading Books Aloud (Closed Set-> Bridge Set)

Computer Self Auditory Training (Hardest Level of Closed Set -> Bridge Set)

Audiobooks (Listening to Story Only) (Bridge Set -> Open Set)

Rap Music (Highest Level of Open Set for Music Stimuli)

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